REMARKS

In paragraph 1 of the Office Action claims 1-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Gill et al (US 2004/0090718), stating:

> "Claims 1 and 10, Gill et al shows a hard disk drive including a magnetic head including a read head element in Fig. 5, including: a pinned magnetic layer 512 (line 12); a free magnetic layer 516 having a central portion 536 thereof having a free magnetization; a magnetic bias layer 522 (line 1), including a central portion 538 thereof that is disposed across the central portion of the free magnetic layer; the central portion of the bias layer being comprised of a material having an approximately zero magnetic moment (lines 8-13); a barrier layer 540 (lines 16-19) being disposed across the central portion of the bias layer.
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> Claim 19, as described above, gill et al shows a method for fabricating a magnetic head, including: fabricating a free magnetic layer; fabricating a magnetic bias layer across the free magnetic layer; oxidizing a central portion of the bias layer; depositing an oxygen diffusion barrier layer upon the oxidized central portion of the bias layer.
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> Claims 2 and 11, Gill et al further shows that the central portion of the bias layer is comprised of an oxidized material (lines 16-19), and the barrier layer is comprised of a material Rh or Ru, which is inherently a barrier to oxygen diffusion from the central portion of the bias layer Claims 3 and 12, Gill et al shows a thin spacer layer 523 that is disposed upon the free magnetic layer 521, wherein the bias layer 522 is disposed upon the thin spacer layer 523 and the barrier layer 540 is deposed upon the bias layer.
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> Claims 4 and 13, Gill et al further shows that the barrier layer is comprised of a material that has low electrical conductivity.
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> Claims 5, 14, and 20; Gill et al further shows that the barrier layer 540 is comprised of Ru or Rh (lines 13-15).
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> Claims 6, 7, 15, 16, 21, and 22; Gill et al further shows that the barrier layer has a thickness of approximately 20 A (lines 3 1-33).
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> Claims 8 and 17, Gill et al further shows that the thin spacer layer is comprised of a material that is a barrier to oxygen diffusion.
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> Claims 9 and 18, Gill et al further shows that the thin spacer layer is comprised of Ru (lines 23-24)."

Responsive hereto, Applicant has amended independent claims 1, 10 and 19 to recite limitations that are not taught by the cited prior art. Particularly, regarding amended independent claims 1 and 10, Applicant has added further limitations regarding the desired location of the barrier layer, as is depicted in Fig. 5 of the application and described on page 9, line 21 through page 10, line 13 of the specification; specifically, that the barrier layer location is limited and does not extend across the areas 184 (see Fig. 5) between the electrical leads, in order to reduce the unwanted flow of electrical sensor current through the barrier layer.

With regard to the prior art Gill '527 patent (publication US2004/0090718), it teaches the formation of a barrier layer above the bias layer and upon the electrical leads. However, it does not teach the removal of unwanted portions of the barrier layer that are initially deposited between the electrical leads in portions of the magnetic head that are away from the central portion. Specifically, with reference to Fig. 5 of Applicant's specification, Gill '527 fails to teach the removal of the barrier layer from area 184 of the device. Applicant therefore respectfully submits that amended independent claims 1 and 10 recite limitations regarding the location of the barrier layer that are not taught by the cited prior art.

With regard to method claim 19, it has been amended to recite the additional process steps of removing portions of the barrier layer that are deposited at locations other than upon said electrical leads and upon said central portions of said bias layer." The prior art Gill '527 patent does not teach these separate process steps. Applicant therefore respectfully submits that independent claim 19 recites limitations that are not taught by the cited prior art.

With regard to dependent claims 2-9, 11-18 and 20-22, Applicant respectfully submits that these dependent claims are allowable in that they depend, either directly or indirectly, from an allowable independent base claim.

Applicant further notes that the inventor of the Gill '527 prior art patent is also a co-inventor of the present application, and that the present application and the '527 patent are owned by the same entity, Hitachi Global Storage Technologies, Netherlands B.V.

In paragraph 2 of the Office Action claims 1- 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horng et al (US2003/0179517) in view of Redon et al (US 6,381,107), stating:

> "Claims 1 and 10, Horng et al shows a hard disk drive including a magnetic head including a read head element in Fig. 3b, including: a pinned magnetic layer 30 (a free magnetic layer 27 having a central portion 10 thereof having a free magnetization; a magnetic bias layer 25, including a central portion thereof that is disposed across the central portion of the free magnetic layer; the central portion of the bias layer being comprised of a material having an approximately zero magnetic moment (lines 10-44).
>
> Horng et al does not show a barrier layer being disposed across the central portion of the bias layer.

Redon et al shows a magnetic head in Fig. 5 having a barrier layer 75 made of Rh or Ru (Column 5, lines 51-53).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add the barrier layer 75 into Horng et al's device. The rationale is as follows: Horng teaches a magnetic head with the core portion. It is obvious it has to be sealed for using in a apparatus. Redon et al teaches to add the gap layer 71 and 75 for protecting the core, which is common practice in the art. Redon et al further teaches that the layer 75 can be used for adjusting the distance between the shields (Column 5, lines 53-54). One of ordinary skill I the art would have been motivated to add the barrier layer into Horng et al's device for protecting and adjusting the distance between the shields.

Claim 19, the combination of Horng et al and Redon et al includes a method for fabricating a magnetic head, including: fabricating a free magnetic layer; fabricating a magnetic bias layer across the free magnetic layer; oxidizing a central portion of the bias layer; depositing an oxygen diffusion barrier layer upon the oxidized central portion of the bias layer.

Claims 2 and 11, Horng et al further shows that the central portion of the bias layer is comprised of an oxidized material CoFeO (line 11-13), and the barrier layer is comprised of a material Ru or Rh, which is inherently a barrier to oxygen diffusion from the central portion of the bias layer.

Claims 3 and 12, Horng et al further shows that the magnetic head includes a thin spacer layer 28 that is disposed upon the free magnetic layer, wherein the bias layer is disposed upon the thin spacer layer; in Horng et al and Redon et al's device, the barrier layer is deposed upon the bias layer.

Claims 4 and 13, Redon et al shows that the barrier layer is comprised of a Ru or Rh, which has low electrical conductivity.

Claims 5, 14, and 20; Redon et al shows that the barrier layer is comprised of Ru or Rh.

Claims 6, 15, and 21; Redon et al further shows the barrier layer is comprised of Ru having a thickness of 50 A (Column 4, line 61-62), which is approximately 40.

Claims 7, 16, and 22; Redon et a! shows that the thickness is adjustable (Column 5, lines 53-54). Applicant does not disclose any unexpected result for choosing 20 A over 50 A. One of ordinary skill in the art would be able to determine the thickness through experimentation, which would includes the thickness of 20 A.

Claims 8, 9, 17, and 18; Horng et al shows that the thin spacer layer 28 is comprised of a Ru that is a barrier to oxygen diffusion."

Responsive hereto, as described above, Applicant has amended independent claims 1, 10 and 19 to recite limitations that are not taught by the cited prior art. Particularly, regarding amended independent claims 1 and 10, Applicant has added further limitations regarding the desired location of the barrier layer, that the barrier layer location is limited and does not extend across the areas 184 (see Fig. 5) between the electrical leads, in order to reduce the unwanted flow of electrical sensor current through the barrier layer.

As indicated in the Office Action, "Horng et al does not show a barrier layer being disposed across the central portion of the bias layer." In that Applicant has amended independent claims and 1 and 10 to recite the further limitations that the barrier layer, Horng et al. likewise does not show this feature.

With regard to the teachings of Redon et al., it is stated in the Office Action, "Redon et al shows a magnetic head in Fig. 5 having a barrier layer 75 made of Rh or Ru (Column 5, lines 51-53)". Applicant notes in this regard that Redon et al. teaches a current perpendicular to the plane (CCP) device in which the upper and lower shields are also the electrical leads that carry the sensor current, and the current travels perpendicular to the planar layers of the sensor between the electrical leads, as well known to those skilled in the art. However, Redon et al. is not concerned with the shape of the barrier layer, that is, that its location is limited to only above the central portion of the bias layer and above the electrical leads. Rather, Redon's barrier layer is shown as deposited full film across the surface of the device and between the lower and upper electrical leads (shields) rather than being above them. Applicant therefore respectfully submits that amended independent claims 1 and 10 which recite limitations regarding Applicant's barrier layer, and particularly its limited location, are neither taught by nor obvious from the cited prior art.

With regard to independent method claim 19, there is no teaching in Redon that subsequent to the deposition of the barrier layer that portions of the barrier layer are removed, as is recited in amended independent method claim 19. Applicant therefore respectfully submits that amended independent claim 19 recites limitations that are neither taught by nor obvious from the cited prior art.

With regard to dependent claims 2-9, 11-18 and 20-22, Applicant respectfully submits that these dependent claims are allowable in that they depend, either directly or indirectly, from an allowable independent base claim.

Having responded to all of the paragraphs of the Office Action, and having amended the claims accordingly, Applicant respectfully submits that the Application is now in condition for allowance. Applicant therefore respectfully requests that a Notice of Allowance be forthcoming at the Examiner's earliest opportunity. Should the Examiner have any questions or comments

with regard to this amendment, a telephonic conference at the number set forth below is respectfully requested.

Respectfully submitted,

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CERTIFICATE OF MAILING (37 CFR 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited on August 29, 2005 with the U.S. Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: August 29, 2005

Patricia Beilmann